



U.S. Department  
of Transportation

400 Seventh St. S.W.  
Washington, D.C. 20590

Pipeline and  
Hazardous Materials  
Safety Administration

COMPETENT AUTHORITY CERTIFICATION  
FOR A TYPE B(U)  
RADIOACTIVE MATERIALS PACKAGE DESIGN  
CERTIFICATE USA/0348/B(U), REVISION 11

REVALIDATION OF CANADIAN COMPETENT AUTHORITY  
CERTIFICATE CDN/2047/B(U)

This certifies that the radioactive materials package design described is hereby approved for use within the United States for import and export shipments only. Shipments must be made in accordance with the applicable regulations of the International Atomic Energy Agency<sup>1</sup> and the United States of America<sup>2</sup>.

1. Package Identification - MDS Nordion Model F-231, Serial Numbers 7, 8, and 9.
2. Packaging Description and Authorized Radioactive Contents - as described in Canadian Certificate of Competent Authority CDN/2047/B(U), Revision 12 (attached).
3. General Conditions -
  - a. Each user of this certificate must have in his possession a copy of this certificate and all documents necessary to properly prepare the package for transportation. The user shall prepare the package for shipment in accordance with the documentation and applicable regulations.
  - b. Each user of this certificate, other than the original petitioner, shall register his identity in writing to the Office of Hazardous Materials Technology (PHH-23), Pipeline and Hazardous Materials Safety Administration, U.S. Department of Transportation, Washington, D.C. 20590-0001.
  - c. This certificate does not relieve any consignor or carrier from compliance with any requirement of the Government of any country through or into which the package is to be transported.

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<sup>1</sup> "Regulations for the Safe Transport of Radioactive Material, 1996 Edition (Revised), No. TS-R-1 (ST-1, Revised)," published by the International Atomic Energy Agency (IAEA), Vienna, Austria.

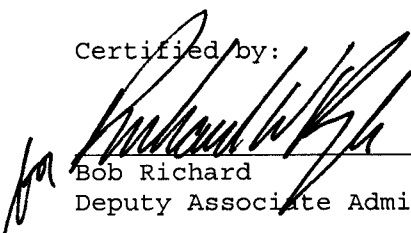
<sup>2</sup> Title 49, Code of Federal Regulations, Parts 100-199, United States of America.

CERTIFICATE USA/0348/B(U), REVISION 11

4. Marking and Labeling - The package shall bear the marking USA/0348/B(U) in addition to other required markings and labeling.
5. Expiration Date - This certificate expires on April 30, 2011.

This certificate is issued in accordance with paragraph 816 of the IAEA Regulations<sup>1</sup> and Section 173.473 of Title 49 of the Code of Federal Regulations<sup>2</sup>, in response to the petition and information dated March 5, 2007 submitted by MDS Nordion, Kanata, Canada and in consideration of other information on file in this Office.

Certified by:

  
\_\_\_\_\_  
Bob Richard  
Deputy Associate Administrator for Hazardous Materials Safety

APR - 9 2007

\_\_\_\_\_  
(DATE)

Revision 11 - Issued to revalidate Canadian Certificate of Competent Authority No. CDN/2047/B(U), Revision 12.



Canadian Nuclear  
Safety Commission

Commission canadienne  
de sûreté nucléaire

Canadian Certificate No. <b>CDN/2047/B(U) (Rev. 12)</b>	Issue Date <b>Mar-29-2007</b>	Expiry Date <b>Apr-30-2011</b>	CNSC File <b>30-A2-196-0</b>
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## **Certificate for Transport Package Design**

The transport package design identified below is certified by the Canadian Nuclear Safety Commission pursuant to paragraph 21(1)(h) of the *Nuclear Safety and Control Act* and Section 7 of the *Packaging and Transport of Nuclear Substances Regulations*, and to the 1973 Revised Edition (as amended) of the IAEA *Regulations for the Safe Transport of Radioactive Material*.

### **REGISTRATION OF USE OF PACKAGES**

All users of this authorization shall register their identity in writing with the Canadian Nuclear Safety Commission prior to the first use of this authorization and shall certify that they possess the instructions necessary for preparation of the package for shipment.

### **PACKAGE IDENTIFICATION**

Designer: **MDS Nordion**  
Make/Model: **F-231, Serial Numbers 7, 8 and 9**  
Mode of Transport: **Air, Sea, Road, Rail**

### **IDENTIFICATION MARK**

The package shall bear the competent authority identification mark "**CDN/2047/B(U)**".

### **PACKAGE DESCRIPTION**

The Model F-231 transport packaging as shown on MDS Nordion Drawing No. F 102001-001, (Rev. AR) consists of a lead filled, steel encased cylindrical assembly with external fins, surrounded on the sides by an insulated cylindrical fire shield, on the top by a flame shield cap and heat screen, and on the bottom by a removable skid. There are vent and drain lines to facilitate wet loading, which are plugged by safety cables and capped.

The cylindrical fire shield consists of 25 mm of "Kaowool" insulation sandwiched in steel and is attached to the packaging assembly by four hex head bolts. The heat screen covers the top flame shield cap and is attached to the cylindrical fire shield. The flame shield cap is fabricated of steel and is attached to the assembly via four slotted bracket assemblies and hex head steel bolts. The containment system consists of the capsule assemblies and the cavity of the F-231 packaging.

An illustration of the package is shown on attached Drawing No. F-231, (Rev. 15).



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The configuration of the package is as follows:

Shape: **Cylinder**  
Mass: **7800 kg**  
Length: **n/a**  
Width: **n/a**

Shielding: **Lead**  
Outer Casing: **Steel**  
Height: **1600 mm**  
Diameter: **1320 mm**

### **AUTHORIZED RADIOACTIVE CONTENTS**

This package is authorized to contain:

1. Not more than 14.8 PBq (400,000 Ci) of Cobalt 60 metal contained within one of the following:
  - a) either AC-195 Type capsules and bundles with 2, 3, or 4 capsules per bundle or AC-339 Type capsules and bundles with up to 6 capsules per bundle carried within a Model F-259 or F-350 eighteen-bundle carrier; or
  - b) a maximum of 86 AC-345 Type capsules carried within a Model F-348 capsule carrier; or
  - c) welded stainless steel capsules that meet the requirements of the International Organization for Standardization, International Standard 2919, First Edition, under the Classification Number E53434 with the capsules retained within a holder that distributes them throughout the cavity volume;
2. or
  - a) not more than 30 TBq (810 Ci) of aluminum-jacketed Cobalt 60 slugs contained within a Model F-360 containment can. The F-360 can must be sealed with 3M DP-190 epoxy adhesive in addition to the 12 screws; and
  - b) miscellaneous nuclides with a total activity not greater than the Type A limits for those nuclides contained within a Model F-360 containment can. The F-360 can must be sealed with 3M DP-190 epoxy adhesive in addition to the 12 screws.

### **QUALITY ASSURANCE**

Quality assurance for the use, maintenance and inspection of the package shall be in accordance with:

- Canadian Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations



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## **SHIPMENT**

The preparation for shipment of the package shall be in accordance with:

- MDS Nordion Procedure No. IN/PP 1483 F-231(4) "Preparation for Shipment of the F-231, F-231(1996) and F-231-MK2 Type B(U) Transport Package (Wet Loading)"
- MDS Nordion Procedure No. IN/PP 1482 F-231(3) "Preparation for Shipment of the F-231, F-231(1996) and F-231-MK2 Type B(U) Transport Package (Dry Loading)"
- Canadian Packaging and Transport of Nuclear Substances Regulations
- IAEA Regulations

The average surface heat flux of the package with 14.8 PBq of Cobalt 60 is  $970 \text{ W/m}^2$ . For heat fluxes exceeding  $15 \text{ W/m}^2$ , supplementary arrangements must be made with the carrier to ensure adequate heat dissipation.

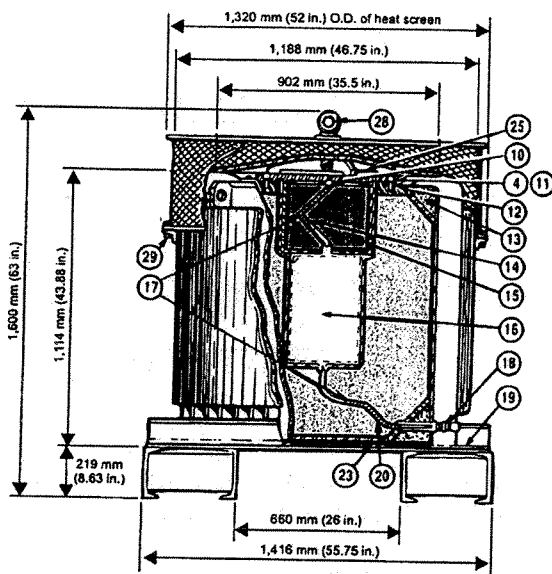
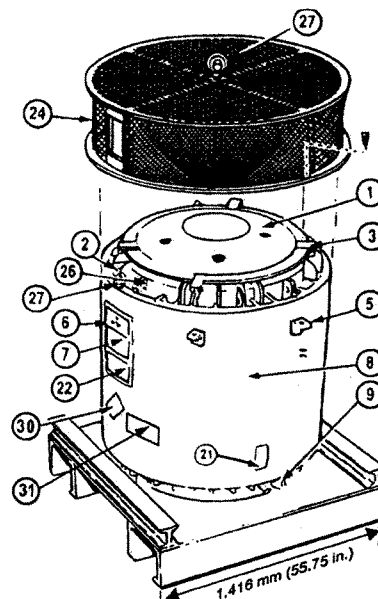
When Cobalt 60 slugs are being transported, the supplementary loading instructions listed in AECL Report No. TR-F231-87015 must be followed.

This certificate does not relieve the shipper from any requirement of the government of any country through or into which the package will be transported.

A. Régimbald  
Designated Officer pursuant to paragraph 37(2)(a)  
of the Nuclear Safety and Control Act

## Notes

1. CNSC Certificate CDN/2047/B(U)
2. Meets IAEA Type B(U) requirements applicable to serial nos. 7, 8 and 9
3. Shielding 285 mm (11.25 in.) lead-steel encased
4. Gross weight: 7,804 kg max. (17,200 lb. max.)
5. Plug weight: 475 kg nominal (1,050 lb. nominal)
6. Floor loading (based on projected floor area): 3,907 kg/m<sup>2</sup> (800 lb./sq. ft.)
7. Maximum contents: 400,000 Ci <sup>60</sup>Co in removable carrier
8. Safety cable plugs used in both vent and drain tube
9. Warning plate: "Safety cable plugs must be used when shipping container loaded"



## Parts list

1. Shield cap with vent holes
2. Retaining brackets for fireshield (4):  
1 in. - 8 x 2 in. lg. hex. hd. bolt, washer, nut
3. Retaining brackets for shield cap (4):  
3/8 - 16 x 1 1/2 in. lg. hex. hd. bolt, washer, nut
4. Plug screws: 3/4 x 1 3/4 in. lg. socket hd. (8)  
and 7/8 - 9 x 2 1/2 in. lg. hex. hd. (2)
5. Heat screen mounting lugs
6. Radiation caution plate (2)
7. MDS Nordion identification plate (2)
8. Removable fireshield
9. 3/4 - 10 x 2 in. lg. hex hd. bolts (4)
10. 3/8 in. NPT pipe plug and safety cable
11. Wire seal installed through heads of hex head bolts (item 4)
12. Neoprene gasket
13. Vermiculite
14. Vent tube
15. Removable plug
16. Cavity 292 mm dia. x 445 mm (11.5 in. dia. x 17.5 in.)
17. Safety cables
18. Cap & nipple on end of drain line
19. Removable shipping skid
20. Drain tube
21. Warning plate (see note 9)
22. Warning - Storage plate: MDS Nordion Dwg. A14649 (2)
23. Transite (steel encased) insulation
24. Heat screen
25. Crack shield ring
26. Lifting/tie-down lugs (4)
27. Shoulder type eyebolts (2) - zinc plated
28. Bolt (1) 3/4 - 10 x 2 in. lg. - zinc plated washers (2)
29. Bolt (4) 3/8 - 16 x 1 1/2 in. lg. hex. hd. - washers (8)  
lock washers (8) zinc plated
30. Category labels (2) on two opposite sides
31. UN number labels (2): one next to each of the two radioactive category labels

**MDS Nordion**

447 March Road, P.O. Box 13500  
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## TITLE

**F-231 Transport Package  
(To IAEA 1973 Transport Regulations)**

REF. IN/SS 1305 F231  
F102001-001

REVISED Jan 03 DCN A2165-D-09A

DATE June 1973

No.

**F-231 (1973)**

ISSUE

**15**

DRAWN CHECKED APPROVED

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400 Seventh Street, S.W.  
Washington, D.C. 20590

**CERTIFICATE NUMBER:** USA/0348/B(U)-85, Revision 11

**ORIGINAL REGISTRANT(S):**

Mr. Marc-Andre Charette  
Manager, Regulatory Affairs  
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CANADA